Chapter-VI

Summary and Conclusion
There are guidelines for some of the metals like Chromium, Nickel, Arsenic, Cadmium, Selenium, Lead, Mercury, Boron, Aluminum, Manganese, Iron, Copper, Zinc, Silver, Barium, Beryllium, Molybdenum, Antimony, suggested by the IS : 10500 and World Health Organization, moreover guidelines for different substances are not directly comparable. Variations in the quality and extent of the scientific information and in the nature of critical effects, although usually reflected in the applied uncertainty factor, result in guideline values that are only to a limited extent comparable between pollutants.

It is necessary to understand the relationship between pollution sources and the concentrations of pollutants in the ground water quality that may come in contact with human beings. Adequate ground water quality studies are very important, since measuring all potential exposure scenarios is not feasible. Some inorganic pollutants will be suspected from through geological and mineralogical conditions of the soil of the particular location which will be dissolved in to ground water and also the dumping of industrial waste water and other wastes in to soil and which will be leach in rainy season in to ground water.

In the present study the selected 35 villages are selected in and around the coastal area of SPSR Nellore District and collected ground water samples. For this present study total 70 ground water samples (Thirty five in the year of 2012 and Thirty five samples in the year of 2013) are collected in and around coastal area of SPSR Nellore district. The ground samples are subjected to analyze for twenty two metals named by Beryllium (Be), Boron (B), Aluminum (Al), Antimony (Sb), Manganese (Mn), Molybdenum (Mo), Iron (Fe), Copper (Cu), Zinc (Zn), Indium (In), Tin (Sn), Barium (Ba), Thallium (Tl), Silver (Ag), Arsenic (As), Nickel (Ni), Chromium (Cr), Lead (Pb), Cobalt (Co), Selenium (Se), Mercury (Hg) and Cadmium (Cd) by using different analytical techniques named by ICP-MS and ICP-OES techniques.

The present study confirmed the presence of seventeen metals named by Nickel, Cobalt, Arsenic, Selenium, Lead, Cadmium, Boron, Aluminum, Manganese, Iron, Zinc, Barium, Silver, Copper, Chromium, Mercury and Molybdenum and absence of five metals named by Indium, Thallium, Beryllium, Antimony, Tin in the ground water locations of coastal area of SPSR Nellore district.
The analytical data obtained for twenty two metal contaminants which are analyzed by using ICP-OES and ICP-MS techniques. In between the sample analysis standard checks and also spike recovery studies have carried out for all twenty two metals the blank matrix and recoveries are calculated. Very good Linearity and Spike recoveries are observed all 22 metals in both ICP-OES and ICP-MS techniques in the ground water samples. The spike recoveries are observed minimum of 80%. This standard check and spike recovery studies have given authentication in the analytical results and efficiency of the analytical instruments.

Identification and quantification of metals such low levels is one of the greatest challenge in the analytical chemistry. Previously it was difficult to detect the pollutants in ground water such low levels. Now the analytical chemistry and technology has developed randomly. Therefore, the technology is available to identify and quantify the pollutants up to parts per trillion levels or even low. The sophisticated analytical techniques playing a key role in the environmental research to identify the pollutants at low levels. In this present study analytical sophisticated instruments named by ICP-MS and ICP-OES have employed key role in the estimation of trace metals upto parts per billion levels with good repeatability and reproducibility in the analytical data.

ICP-OES and ICP-MS techniques are advanced and widely using techniques for estimation of trace metals in various matrices. ICP-OES is based on emission technique. By using ICP-OES technique we can determine minimum 10 ppb levels, we con not determine less than 10 ppb level concentrations of metals with accuracy by using this ICP-OES technique. ICP-MS technique is based on m/z ratio and by using this technique we can determine isotopes of the metals. Most of the interference will be removed by using this ICP-MS technique and also we can achieve very lower detection limits. By using ICP-MS we can determine less than 1 ppb levels concentrations of metals with good accuracy and precision.

Both ICP-MS and ICP-OES techniques are employed key role in the present study for the determination of twenty two metals in ground water quality of thirty five villages in coastal area of SPSR Nellore district. The metal concentrations are varied from ppb levels to ppm.
levels different locations of the study area. Most of the selected locations are near to the coastal area. The variations of metals concentrations in different locations are may be due to the geological condition of the particular location.

Each metal have its one significance to act as a micro nutrients to the human beings up to certain levels. Beyond the limits this metals might be act as a carcinogenic and might be cause several health effects to the human beings. Many of these metals verified by laboratory analysis were metabolites of known human carcinogens and exceeded concentration levels of these metals in ground water quality may cause both short-term and long-term effects to the human beings.

Most of the regulatory authorities are working on the ground water quality with respect to its significance and health effects to the human beings. Maximum permissible limits for some of the metals are not adopted by IS: 10500 and World Health Organization. The studied metals in the ground water quality indicate quantities in less than compared to Regulatory Limits except Nickel in Mallam village, Lead in Meezuru Village, Manganese in Jalapaddipalem, Devuni Kandrika, Venkanna palem villages, Barium in Thummalapenta villages.

Selenium in Venkannapalem village, Nickel in Mallam village, Aluminium in Jalapaddipalem, Devuni Kandrika are observed higher concentration levels then compared to acceptable limits of IS:10500 but with in permissible limits of IS:10500 / WHO.

This study is not to be considered as a comprehensive study but rather a baseline assessment that allows for further monitoring of ground water quality studies. As many of the compounds are highly toxic, it is essential to identify further compounds that were not identified in this study.

The present study suggests that it is essential to control the metal contents which are exceeded in the ground water quality of identified locations by implementation of new techniques. The ground water treatment technologies like Reverse Osmosis, Ultraviolet Purification and other necessary treatment technologies need to be implemented in the village areas depends on the quality of the ground water to provide safe drinking water to the public.
Chapter - VI  Summary and Conclusion

The study recommends the monitoring of ground water quality with respect to toxic nature of the pollutants as well as the health effects of those particular analytes at regular intervals at strategic locations. Health-based standards are generally not representative of chronic inhalation exposures to low levels of pollutants but existing ground water quality data for these twenty two metals provides substantial data to evaluate human exposures and health effects. This ground water quality data might be helpful to focus on the ground water pollution level in and around coastal area of SPSR Nellore district and its probable consequences.